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333. Proposed by J. B. MORRELL, Boulder, Colorado.

Exhibit the fallacious argument to prove that a right-angle is equal to an angle which is less than a right-angle.

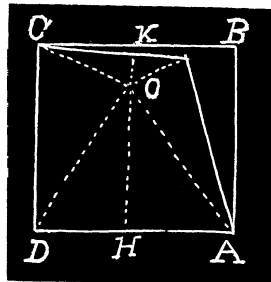
Solution by the PROPOSER.

Let $ABCD$ be a rectangle. From A draw a line AE inside the rectangle equal to AB or DC and making an acute angle with AB as indicated in the diagram.

Bisect AD in H and through H draw HO at right angles to DA . Bisect CE in K and through K draw KO at right angles to CE . Since CB and CE are not parallel the lines HO and KO will meet (say) at O . Join OA , OE , OC , and OD .

Now $OA=OD$ and therefore angle ODA equals angle OAD . OC equals OE , and by construction AE equals CD , therefore triangle COD equals triangle EOA and the homologous angles ODC and OAE are equal.

Now we have ODC equal to OAE , ODA equal to OAE , therefore $ODC+ODA$ equals $OAE+OAD$, or CDA is equal to EAD . But CDA is a right angle and EAD is less than a right angle, therefore the result is impossible.



334. Proposed by J. O. MAHONEY, B. E., M. Sc., Central High School, Dallas, Texas.

Through any point P in the plane of the triangle ABC , draw a line that shall divide the perimeter of the triangle into two equal parts.

Solution by J. SCHEFFER, A. M., Hagerstown, Md.

This problem reduces to the following: Through a given point in the plane of a given angle to draw a straight line which cuts off from the sides of the angle two intercepts the sum of which is equal to a given line, viz., the half-sum of the three sides of the triangle.

Let AX and AY be the sides of the angle; P be the given point. Draw $PD=n$, parallel to AY , and put $AD=m$. Denote the semi-perimeter of the triangle by s . Let MPN be the required line, M a point in AY and N in a point AX . Then $AM : n = AN : AN - m$, and $AM + AN = s$. From these two relations we find the quadratic

$$AN^2 - (s - n + m)AN = -ms,$$

which admits of an easy geometric construction. Since this equation furnishes two values, and the three angles of a triangle admit of three combinations of two at a time, there are really six solutions of the problem.

Also solved by G. B. M. Zerr, H. V. Spunar, and C. N. Schmall.